

# Industrial Applications



Your global leader for industrial adhesives.

# The right solutions. **The right partner.**

### Avery Dennison Helps You Achieve Better Results.

Avery Dennison is a global leader in pressure-sensitive technology and innovative self-adhesive solutions for consumer products and label materials. Founded in 1935, Avery Dennison develops, manufactures and markets a wide range of products for consumer and industrial markets, including:

- Specialty tapes and chemicals
- Avery-brand office products
- Fasson-brand self-adhesive materials
- Peel-and-stick postage stamps
- Reflective highway safety products
- Automated retail tag and labeling systems

Headquartered in Pasadena, California, Avery Dennison employs more than 22,000 employees in over 150 manufacturing and distribution facilities in 49 countries around the world.

Everyday and at every location, we strive to be the world's best coating and converting company by providing innovative decorating, information transfer and bonding solutions that enable our customers to succeed.



## Your Global Leader for Industrial Adhesive Solutions.

The Specialty Tape Division is a world-class operation that specializes in the production of high-performance, pressure-sensitive adhesives. The division has been delivering superior, multi-functional adhesive solutions to companies worldwide since 1969, including products that:

- · lead to quieter, more efficient cars
- offer a better way to affix building materials
- damp noise and vibration in appliances
- provide advanced security closures for courier shipping cartons
- establish critical seals in heating and air conditioning systems
- can be custom made to solve your special challenges

Avery Dennison Specialty Tape Division maintains facilities located strategically on every continent ... supported by sales offices situated throughout the world. As your global business partner, we provide the resources you need, including manufacturing facilities in the United States, Belgium and China.



Avery Dennison delivers exceptional adhesive solutions and personalized, customer support to the industrial marketplace, including the following core markets: Transportation; Electronics and Appliances; Building, Construction and HVAC; Optical and CMP; Packaging and Specialty.

## Solutions that Get the Job Done.

We understand your industry, your company, and how to make your business more successful. So, wherever you are located, whatever your industrial application needs, we will work with you to identify and create the right solution to improve your business, productivity and profitability.

Avery Dennison delivers a comprehensive portfolio of specialty tape products that help make you more efficient and more competitive.

- Our pressure-sensitive materials help reduce assembly time while enhancing freedom of design.
- Our materials replace expensive mechanical fastening systems.
- Our unique solutions offer the ability to dampen noise and vibration for smoother, quieter operations.
- Our solutions are cost-effective and easy-to-use alternatives to wet glues and other fastening materials.





# All the **Right Stuff.**

Our world-class manufacturing operation produces a diverse range of tape constructions from transfer to single-coated, double-linered transfer and double-coated tapes. Proprietary adhesive and coating technologies are engineered into tape products that meet all of the fastening and bonding needs of even the most demanding applications.

	Adhesive Technologies	Coating Technologies	Diverse Substrates
	<ul> <li>Rubber/Elastomer-based</li> <li>Pure and modified</li> </ul>	<ul> <li>Hot melt</li> <li>Solvent</li> </ul>	<ul> <li>High performance films</li> <li>Aluminum foils</li> </ul>
	acrylics	• Emulsion	• Non-wovens
	• Silicones	• Enuision • E-beam curable	• Felts and fabrics
	•Emulsions		• Fells and fabrics
	Release Liner Adhesive	Release Liner Adhesive Carrier (paper, film, tissue, foam or nonwoven) Adhesive	Facestock Adhesive Release Liner
Tra	nsfer Double	-Coated Single	e-Coated Double-Li Transfer
	Release Liner Adhesive Carrier (paper, film, dissue, foam or nonwoven) - Adhesive - Release Liner	Adhesive Heat-Active Bonding La	Adhesive
	Double-Linered Double-Coated	Heat Activate	d Self-Wound

# CORE MARKETS

### Transportation

Transportation engineers continually face a diverse range of challenges – to improve performance, to reduce overall weight, to simplify maintenance, to reduce labor costs and increase profitability. But the selection of the right partner, one with exceptional industry experience and a solid track record of working hand-in-hand with engineers to create custom bonding solutions is the first critical step toward meeting your goals.

Avery Dennison will help you make a positive impact in your company. Our industrial adhesive solutions secure components more effectively in the interior, as well as the exterior ... contribute significantly to laminate constructions in controlling noise and vibration and thermal insulation ... and increase

the performance of exterior trim components by creating exceptional adhesion to low surface energy clearcoats and thermoplastic polyolefins (TPOs) to enhance quality and performance of your products.

In addition to satisfying the most demanding design specifications, Avery Dennison specialty tapes meet stringent global environmental standards. Our more than three

decades of experience serving the transportation industry and building relationships with international suppliers and OEMs has provided the insight and expertise to meet your transportation bonding needs. Today, tomorrow, here and around the world.

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#### Key Transportation Industry Applications

- Noise, vibration and harshness solutions
- Low surface energy bonding
- Interior bonding
- Exterior trim bonding
  - Body side molding
  - Badging and emblem
  - Weatherstripping
  - Other decorative trim
- Thermal insulation/heat shield
  - Interior
  - Under hood
- Gasketing and sealing



### **Electronics & Appliances**

The electronics and appliance industries continue to grow at a robust rate. This creates an increase in demand for adhesives that effectively bond components, seal out moisture, minimize noise and vibration and contribute to operational efficiency in the manufacturing of the product.

Avery Dennison industrial adhesives offer proven solutions, many of which are UL approved, to a broad range of needs:

- Sound and vibration management
- Low surface energy bonding
- Gasketing and sealing
- General mounting and assembly
- Identification and graphics
- Thermal insulation/heat shields
- EMI/RFI shielding

Avery Dennison applies the engineered materials and fastening techniques to address critical industry challenges, such as achieving increased performance, improved energy efficiency and reduced weight. Whatever your needs are, our team of professionals will develop customized solutions that deliver optimal results.



# CORE MARKETS

### Building, Construction & HVAC



Avery Dennison provides quality foil and insulation tapes for the HVAC/R and industrial insulation industries, including FASSON<sup>®</sup>-brand tapes that meet or exceed UL 181A-P and UL 181B-FX standards.

Customers can choose from a complete line of plain foil, FSK, ASJ and cloth duct tapes, tested in accordance with UL 723. These adhesvises are well suited for delivering a fast permanent bond, creating a moisture vapor barrier for closure and sealing duct board, flexible duct and insulation facings. Other products include spray adhesive and flexible duct hanging straps.

#### Key Building, Construction & HVAC Industry Applications

- Acoustics
- Fiberglass ductboard
- Flexible duct
- Insulation/facing
- Pipe insulation
- Metal buildings
- Hanging and sealing products





### **Optical & CMP**

Avery Dennison pressure-sensitive adhesives, which are effective in an aggressive chemical and high temperature environments, have been developed, manufactured and tested in some of the world's leading optical laboratories. The demands for lens edging call for an easy-on and easy-off solution for all types of surfaces – including coated, mineral and organic glass. Our tape solutions for pads and laminates are highly torque-resistant, enabling you to provide more exact finishing, polishing and edging using the most advanced equipment.

Likewise, Avery Dennison provides adhesive solutions expressly formulated to meet the demanding needs of the semiconductor industry. These high performance products are made to withstand the corrosive process environments in chemical slurries, as well as the intensive circular sanding equipment used to polish wafers.

Key Optical & CMP industry applications include:

- Opthalmic consumables
  - Thermal resistance
  - Chemical resistance
  - Low surface energy bonding
- Chemical mechanical planarization (CMP)

# CORE MARKETS

## Packaging & Specialty

Avery Dennison solutions for the graphics and packaging industry will help you look and perform better.

- They give you an edge in the field of security, providing better self-adhesive security labels that combine identification, traceability, electronic surveillance and detection.
- They provide a tamper-resistant closure system for overnight boxes.
- They provide retail display solutions, including point of purchase displays, shelf talkers and hang tabs.
- They affix substrates to fabric and can withstand industrial washing.

We understand that every company's needs are different. This is precisely why Avery Dennison adhesives are highly customizable. We create and customize adhesives in numerous configurations using different liners and carriers.

You provide the bonding challenge, and Avery Dennison will provide you with a high performance solution.





# The Right Solutions. The Right Partner. **Right Here. Right Now.**

Avery Dennison Specialty Tape Division is a global leader in industrial adhesive solutions. For nearly half a century we have worked hand-in-hand with automotive, electronic, HVAC, packaging and optical industry customers to experience, understand, and help them overcome their adhesion challenges. Whether applying existing science or developing new chemistries, we remain focused on the creation of practical solutions that work and set new standards in performance.

We offer the best-trained and most experienced personnel ... the most advanced research and development capability ... and the most amazing results. Begin working with the partner that has all the right solutions. Right here. Right now.





#### **Specialty Tape Division**

250 Chester Street Painesville, OH 44077 866-GO-AVERY (866-462-8379) / FAX 440-358-3298 www.stus.averydennison.com





# Low Surface Energy Bonding



Your global leader for industrial adhesives.

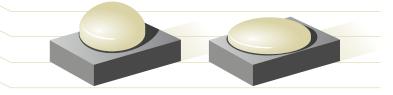
# The right solutions. **The right chemistry.**



# New Trends. New Challenges.

Low surface energy (LSE) substrates, such as polypropylene (PP), polyethylene, thermoplastic polyolefins (TPOs) and clearcoat paint systems have become increasingly popular in diverse applications. These substrates are cost-effective, light weight, chemical resistant and versatile to process. However, they are more difficult to adhere to requiring innovative-engineered adhesive solutions.

LSE materials do not allow a liquid, like an adhesive, to quickly 'wet out' on the surface. This creates a challenge because the better an adhesive can wet out on a substrate, the more surface area it can cover. This allows more direct surface contact to secure a stronger bond.

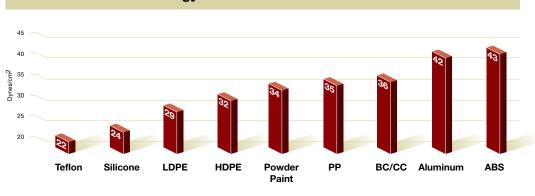


Low Surface Energy

**High Surface Energy** 

Envision an un-waxed car. When it rains, the water spreads out (or wets out) on the car creating puddles. In this case, the car's surface is displaying high surface energy. However, a waxed car will create water to bead up because the car's surface is displaying low surface energy.

Therefore, because pressure-sensitive adhesives bond when they can wet out a surface, adhesives bond extremely well to high surface energy materials similar to water on an un-waxed car. Low surface energy materials (similar to a waxed car), create bonding challenges because adhesives have difficulty wetting out the surface.



#### Surface Energy of Common Industrial Substrates

Low surface energy

High surface energy



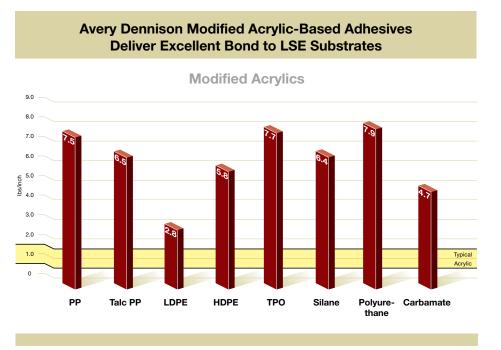


# **Avery Dennison Solutions.**

Avery Dennison recognizes the need in the marketplace for adhesives that effectively bond to a variety of LSE substrates. This is precisely why we employed our proprietary technology to develop multiple adhesive solutions, such as: rubber, acrylic, silicone and cross-linked adhesives.

**Rubber-Based Adhesives:** Rubber-based adhesives have excellent bond, high tack and low-to-medium heat resistance. These features make rubber adhesives a cost effective solution for numerous applications.

**Modified Acrylic-Based Adhesives:** Avery Dennison modified acrylic-based adhesives have medium tack and medium heat resistance. In addition, our modified acrylic-based adhesives deliver good environmental resistance.



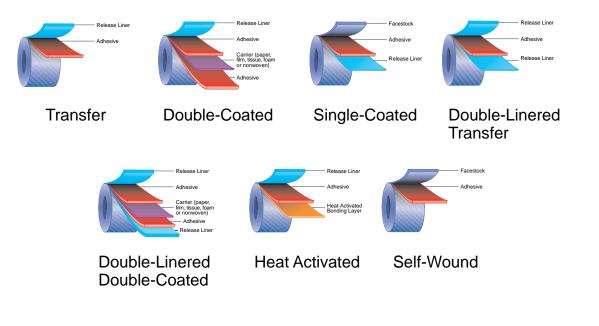
Test method: 180 degree adhesion peel; 12 ipm crosshead speed; 2 mil. polyester support.

**Cross-linked Adhesives:** Avery Dennison's extensive experience and knowledge have helped us develop patented, cross-linked adhesives, which we have developed as our Ultra High Adhesion (UHA) product line. Our UHA products provide outstanding bonding properties to PP, talc-filled polypropylene, low-and-high density polyethylene and TPOs. Not only do they bond effectively to LSE substrates, but they also deliver excellent heat resistance and high tack.

**Silicone Adhesives:** Silicone adhesives have excellent heat resistance with service temperatures up to 450°F. In addition, they are the only specialty tapes that will effectively bond to silicone substrates.

# Versatile Tape Constructions.

Avery Dennison adhesives are highly customizable. We create and customize our engineered adhesives in numerous configurations using different liners and carriers. Whether your needs demand transfer, double-coated, single-coated or doublelinered transfer tapes, we will work with you to meet your specific needs and deliver exceptional results.



Specialty Tape Division 250 Chester Street Painesville, OH 44077 866-GO-AVERY (866-462-8379) / FAX 440-358-3298 www.stus.averydennison.com





# LSE "Low Surface Energy"

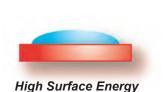
#### Low Surface Energy

Surface energy, expressed in dynes/cm<sup>2</sup>, is a measure of the ability of a material to "wet out" onto a surface. High surface energy (HSE) materials allow pressure sensitive adhesives (PSAs) to easily bond to the surface while bonding to low surface energy (LSE) materials requires specifically engineered adhesives.

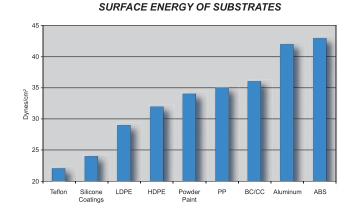
Since LSE plastics tend towards low-cost and fast production, use of these materials is increasing in all industries. Many of the new automotive clear coat paints also have very low surface energy. Carbamate paint systems have surface energies as low as polypropylene and each new generation of these paints exhibit lower surface energy than the last. In addition to these low surface energy materials, some industrial applications require bonding to lightly oiled metals.

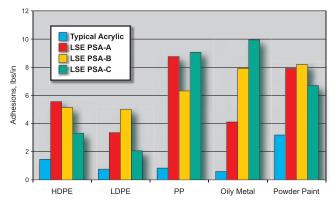
Avery Dennison's tapes have the ability to bond to these substrates without pre-treating the surface with adhesion promoter, scuffing, corona treatment or heat treatment.





Low Surface Energy





PSA PERFORMANCE TODAY

Adhesive	Loop Tack	RT Static Shear	SAFT	Special Features	
Α	High	Med	Low	General Pupose Rubber	
В	High	High	Med	General Purpose Rubber	
C	Med	Med	Med	General Purpose Acrylic	
D	Med	Med	Med	Low fogging	
B C D E F	Med	Low	Low	Fiber filled	
	High	High	High	Heat resistance	
G	High	High	High	Heat resistance	
Adhesive A Item Number	Description	Liner Description	Adhesive Coat Weigl Liner Side	nt Carrier Description	Adhesive Coat Wieght Unwind Side
180230054	FT C	60# Kraft	1.5	10# Tissue	1.5
464820054	FT 8302	60# Kraft	1.4	0.5 MILPET	1.7
464820060	FT 8302	60# Kraft	1.4	0.5 MILPET	1.7
464890054	FT B	80# Kraft	1.5	0.5 MILPET	1.7
464890060	FTB	80# Kraft	1.5	0.5 Mil PET	1.7
568750054	FT B 12 PT BD	12 PT BD	1.5	0.5 Mil PET	1.7
568750060	FT B 12 PT BD	12 PT BD	1.5	0.5 Mil PET	1.7
464760054	FT D	60# Kraft	2.4	0.5 MII PET	2.4
564870056	FT 8374	80# Kraft	2.3	0.5 Mil PET	2.4
Item Number 567720061	Description FT 1159 dev	Liner Description 80# Kraft	Adhesive Coat Weigl 2.1	nt	
Adhesive B Item Number	Description	Liner Description	Adhesive Coat Weigl Liner Side	nt Carrier Description	Adhesive Coat Wieght Unwind Side
872040054	FT 8305	60# Kraft	1.2	0.5 Mil PET	1.2
560990054	FT 8327	80# Kraft	1.5	0.5 MILPET	2
563925560	FT 8327 60"	80# Kraft	1.5	0.5 MILPET	2
577115554	FT 445	60# Kraft	2.3	0.5 PP Film	2.3
580540054	FT 8345	60# Kraft	2.4	0.5 Mil PET	2.4
56515NC54	FT 8345 PET	2 Mil PET	2.4	0.5 Mil PET	2.4
Adhesive C					
Item Number	Description	Liner Description	Adhesive Coat Weigh Liner Side	nt Carrier Description	Adhesive Coat Wieght Unwind Side
Item Number 566460054	Description FT 8397	60# Kraft		nt Carrier Description 0.5 Mil PET	Unwind Side
	•	•	Liner Side	•	Unwind Side
566460054 561280060	FT 8397 FT 8217	60# Kraft 60# Kraft	Liner Side 1.0 2.1	0.5 Mil PET 0.3 Oz Nonwoven	Unwind Side
566460054	FT 8397	60# Kraft	Liner Side 1.0	0.5 Mil PET 0.3 Oz Nonwoven	Unwind Side
566460054 561280060 Item Number 560840054	FT 8397 FT 8217 Description	60# Kraft 60# Kraft Liner Description	Liner Side 1.0 2.1 Adhesive Coat Weigl	0.5 Mil PET 0.3 Oz Nonwoven	Unwind Side
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566460054 561280060 Item Number 560840054 Adhesive D Item Number	FT 8397 FT 8217 Description FT 1123 Description	60# Kraft 60# Kraft Liner Description 80# Kraft Liner Description	Liner Side 1.0 2.1 Adhesive Coat Weigh 3.0 Adhesive Coat Weigh	0.5 Mil PET 0.3 Oz Nonwoven nt	Unwind Side
566460054 561280060 Item Number 560840054 Adhesive D Item Number 564930054	FT 8397 FT 8217 Description FT 1123 Description FT 1149	60# Kraft 60# Kraft Liner Description 80# Kraft Liner Description 84# Natural Stayflat	Liner Side 1.0 2.1 Adhesive Coat Weigh 3.0 Adhesive Coat Weigh 4.9	0.5 Mil PET 0.3 Oz Nonwoven nt	Unwind Side
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Specialty Tape Division

Avery Dennison Specialty Tape Division US Tel: 866-GO-AVERY Fax: 888-358-4469 http://stus.averydennison.com

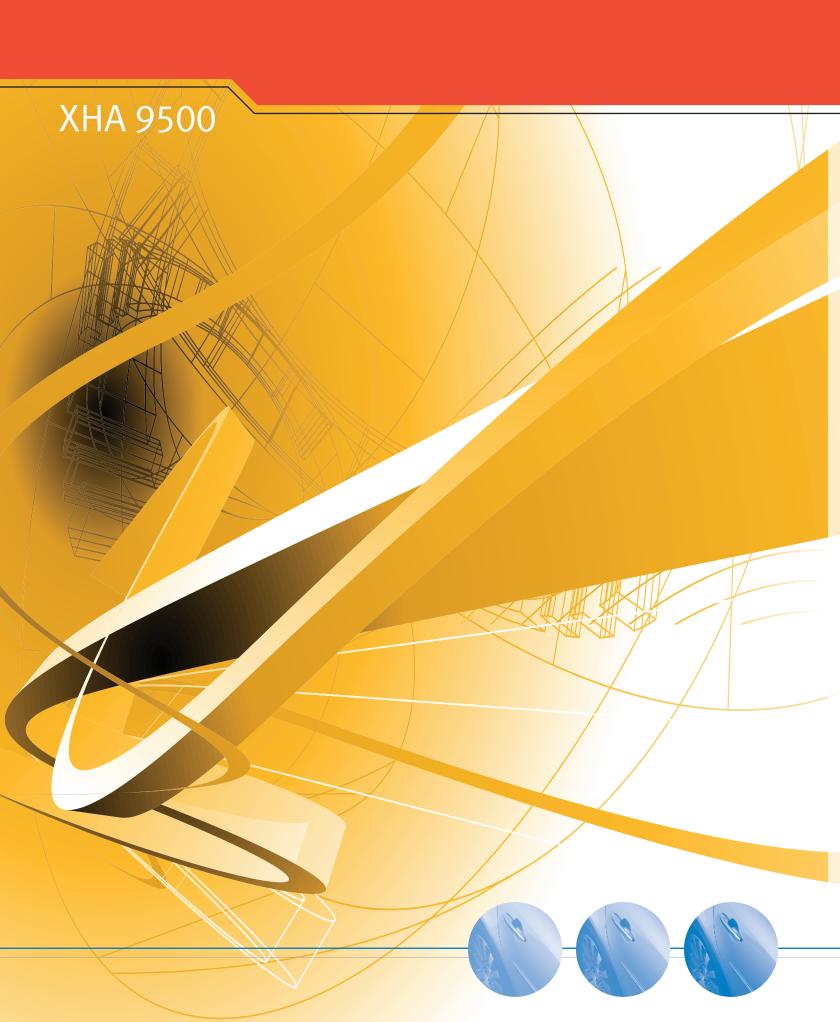


Automotive Exterior Attachment Tape XHA 9500

# The right solutions. **Right now.**

Driving Technology Forward in Exterior Applications

# XHA 9500





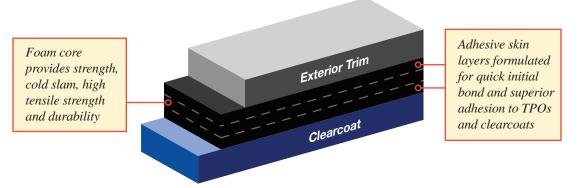
Automotive Exterior Attachment Tape XHA 9500

# New Trends. New Challenges. Avery Dennison Solutions.

Avery Dennison Specialty Tape Division has a proven track record in the automotive industry. For more than two decades, we have worked closely with OEMs and Tier One suppliers to evaluate and solve attachment problems. As a result, Avery Dennison developed pressure-sensitive adhesives that solve issues such as bonding to low surface energy surfaces, managing vibration and sound issues, chemical and environmental resistance, and flame and smoke resistance.

The newest solution in our automotive adhesives portfolio is the Avery Dennison *Automotive Exterior Attachment Tape* XHA 9500. This new grade of Avery Dennison cross-linked high adhesion elastomer technology effectively attaches exterior trim to the "toughest to stick to" TPOs and clearcoats.

XHA 9500 is the first **cross-linked high adhesion elastomer tape product** that Avery Dennison is introducing to the automotive industry for exterior and interior applications.



The tape construction of XHA 9500 is foam core with adhesive skin layers. It is **100% black**, providing exceptional aesthetics, design flexibility and UV stability.

# XHA 9500

# Delivering a High Performance Solution.

Body side molding

Wheel flares

The growing use of low surface energy (LSE) materials, including thermoplastic polyolefins (TPOs) and new clearcoat chemistries, has created exterior trim attachment challenges for the automotive industry.

Seeing the opportunity to meet the industry's demanding application needs, Avery Dennison has employed its patented technology to create a solution that provides enhanced attachment

> performance and improved manufacturing efficiencies. In performance tests, XHA 9500 excelled, **surpassing OEM material specifications**.

XHA 9500 reflects more than two years of extensive research and testing. The result is a new exterior trim attachment tape

that meets multiple demands of OEMs and Tier One suppliers.

Avery Dennison Automotive Exterior Attachment Tape XHA 9500 delivers several key performance benefits:

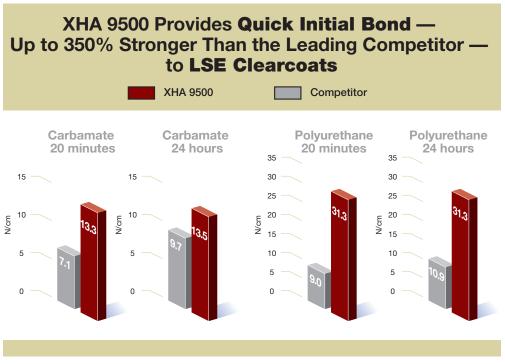
FEATURES	BENEFITS		
Quick initial bond and superior adhesion to LSE materials	Delivers exceptional and consistent performance required for a variety of application systems, reducing adhesion failures		
Primerless on most TPO surfaces	Eliminates steps in the production process, which reduces application time and costs, and prevents the handling and exposure to hazardous materials		
Cold impact resistance	Passes OEM cold slam testing		
Durability	Offers excellent UV and gasoline resistance		
100% black	Provides exceptional aesthetics, design flexibility and UV stability		



Automotive Exterior Attachment Tape XHA 9500

## The Proof.

XHA 9500 delivers **quick initial bond** and **superior adhesion to low surface energy materials**, such as LSE clearcoats (carbamate and polyurethane) and TPO moldings. Fast wet out and increased compressibility contribute to a faster initial bond and exceptional adhesion.



Test method: 90 degree peel adhesion; 12 ipm crosshead speed; 7 mil aluminum support; average value recorded.





The most common trim attachment failures occur when the edges of moldings snag. Avery Dennison developed an edge lift test to simulate real-life adhesion performance. The results demonstrate **XHA 9500's excellent bond with high breakaway values**.

The edge lift test involves the test bar being pulled up at 90 degrees from the end and the force measured to initially break the adhesive bond. The test is affected less by the flexibility of the molding and measures the adhesive performance.

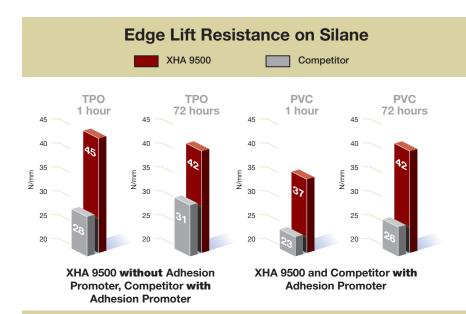
### XHA is Primerless

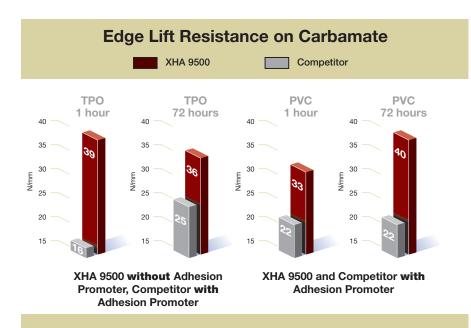
XHA 9500 will not require primer for tape bonding on most TPOs. This can remove steps from the application process, reducing total application time and costs. In addition, it eliminates the handling of and exposure to hazardous materials.



Automotive Exterior Attachment Tape XHA 9500

### XHA 9500 Provides Excellent Bond with High Breakaway Values





Test method: 90 degree cleavage peel, test bar not extended beyond end of panel; 12 ipm crosshead speed; 0.5" x 0.25" x 6" test bars; peak value recorded.



#### **Specialty Tape Division**

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